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RESEARCH ARTICLE

POLYCYSTIC OVARY SYNDROME RESEARCH IN PUBMED (2004–2023): A SCIENTOMETRIC MAPPING WITH REFERENCE TO AYURVEDA

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Abstract

Background: Polycystic ovary syndrome (PCOS) is one of the most prevalent endocrine–metabolic disorders, affecting approximately 8–13% of women of reproductive age worldwide. In recent decades, PCOS has attracted growing research interest across biomedical as well as traditional and integrative medical systems, including Ayurveda. The present study analyzed 16,590 global publications on PCOS indexed in the PubMed database from 2004 to 2023.

Objectives: To assess the growth pattern and global distribution of PCOS-related literature; to analyze publication output across broad subject areas; and to evaluate research trends related to Ayurveda and integrative medicine in the field of PCOS.

Results: A total of 16,590 research articles on PCOS were published during 2004–2023, showing an overall growth rate of 430.49%. China ranked first in terms of total publication output (3,470 documents), followed by the United States. The majority of studies were conducted on human subjects (13,033 records). Analysis of highly influential publications revealed a recent shift toward biomarker identification and molecular translational research over the past three years. In the Indian context, PubMed indexed 21 publications related to Ayurveda in PCOS, predominantly comprising clinical trials and case reports, reflecting emerging interest in traditional and integrative therapeutic approaches.

Conclusion: This scientometric mapping of PCOS research from the PubMed database (2004–2023) highlights global research productivity, evolving scientific trends, and the current status of Ayurveda-based research in PCOS. The findings provide valuable insights for clinicians and researchers, facilitating a better understanding of long-term research trajectories and identifying emerging integrative and translational research hotspots in PCOS management.

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Introduction:-

Polycystic ovary syndrome (PCOS) is one of the most common endocrine and metabolic disorders affects an estimated 8–13% of reproductive-aged women.[1] Prevalence of PCOS in India ranges from 3.7 to 22.5 per cent depending on the population studied and the criteria used for diagnosis.[2] Polycystic ovary syndrome (PCOS) is a complex condition characterized by elevated androgen levels, menstrual irregularities, and/or small cysts on one or both ovaries.[3] Women with PCOS have higher rates of endometrial cancer, cardiovascular disease, dyslipidemia, and type-2 diabetes mellitus.[4] Clinical manifestations of this syndrome such as irregular menstrual cycle, acne or oily skin, excessive hair on the face or body, male-pattern baldness or hair thinning ,weight gain, infertility, biochemical and hormonal disturbances has been widely described . Yet, these symptoms are often related to deterioration in the woman's self-esteem and self-image and may affect their health-related quality of life (HRQoL), particularly in relationship with psychosocial domains.[5] Ayurveda understands a disease based on the Doshas and Dushyas involved in disease manifestation. Hence, the specific nomenclature of the diseases is not much essential. There is no direct reference to PCOS in Ayurveda, but the symptoms can be seen in conditions mentioned in Ayurveda literature like Artava Kshaya[6], Ksheena Artava[7] and Pushpaghni jathaharini[8].Here, articles about PCOS published in 2004–2023 were analyzed to obtain a view of the topic's structure, history, and to document relationships. Global and Ayurveda trends in the most influential publications were also analyzed.

Materials and Methods:-

We collected data by using databases provided by Pub med using the keywords "PCOS", "PCOS and Ayurveda", and "PCOS treatment " from January 1, 2004 to December 31, 2023. The bibliographic information of the search results was downloaded in TXT (Pub Med), and analyzed.

Results:-

Globally, there were a total of 16590 research articles on PCOS in the Pub med during 2004 -2023. Percentage representation of the rate of growth of publications in this field was totally 430.49 %. 305 records were published in 2004 , 333 records in 2005, 401 record in 2006, 406 records in 2007, 482 records in 2008, 548 records in 2009, 588 records in 2010 , 620 records in 2011 , 717 records in 2012 , 728 records in 2013 , 823 records in 2014, 874 records in 2015, 892 records in 2016 , 936 records in 2017, 954 records in 2018, 1109 records in 2019, 1236 records in 2020, 1476 records in 2021 , 1543 records in 2022 and 1619 records in 2023(Chart 1.1)Countries with highest number of PCOS related published articles;The China ranked first on total publication number with 3470 documents followed by the USA, Turkey, India, UK and Germany. (n = 1870, 1179,950, 843, and 319 items respectively)(Chart 1.2).Globally 13033 records were published on Human study, 1860 records on animal study , 747 record of meta analysis , 2689 records of clinical trial , 2161 records of comparative study , 2766 records of review articles ,240 records of multy centre study , 799 records of systemic review , 219 records of observational study.

In India, 456 records were published on Human study , 86 records on animal study , 37 record of meta analysis , 47 records of clinical trial , 53 records of comparative study , 135 records of review articles , 04 records of multy centre study , 48 records of systemic review , 19 records of observational study.(Chart 1.3) Globally, 19-44 year age group was observed in 7105 published records. 45-64 year age group was observed in 982 published records. While 176 published records were observed on 65+ ages. In India, 19-44 year age group was observed in 206 published records. 45-64 year age group wasobserved in 27 published records. While only 03 published records were observed on 65+ ages.(Chart 1.4); In India, 21 records were published in Ayurveda system of medicine, 8 records were published in Naturopathy and Unani.7 records were published in Homeopathy.(Chart 1.5)Among 21 records in Ayurveda 2 records were published in year 2010, 01 record was published in year 2016, 2017, and 2018. 02 records were published in year 2020. 05 records were published in year 2021.03 record were published in year 2022 and 06 records were published in year 2023.(Chart 1.6)

Research Trends On PCOS;

From 2004 to 2010, aresearch hot spot was focused on drug therapy of infertility of PCOS. Although clomifene had been the gold standard treatment for ovulation induction in women with PCOS for many decadesmetformin was emerging as another option for PCOS drug therapy. In the next period, from 2011 to 2015, PCOS infertility drug therapy was still a hot spot of the research. The research focus in this seemed to shift from infertility etiology to the therapeutic use of drugs for infertility. Clomifene or aromatase inhibitors, such as letrozole, were recommended as the 1st line treatment of anovulatory infertility in women withPCOS. Lifestyle modification was considered a first-

line treatment for the management of PCOS women who were overweight or obese.From 2016 to 2019, the research on PCOS hormonal change became a hot spot again. The results showed, during this period, plenty of researches had been done on whether AMH was a good biomarker of PCOS. During 2020 to 2023, there has been a trend toward biomarker discovery and more molecular translational research. Areas such as gene therapy and micro-RNAs are also among the recent hot topics. During this period, the long-term risk of cardiovascular disease in patients with PCOS has attracted extensive cutting-edge. Numerous studies in recent years, that showed a significant difference in composition of gut micro biome between PCOS patients and healthy controls including a decrease in alpha and beta diversity and an alteration in balance of some species of bacteria. Among the Ayurveda published records case reports like effect of Shatapushpa churnama with tila tailam in oligomenorrhea associated with polycystic ovarian syndrome, effect of Vamana Karma with Ikshwaaku Beeja Yoga followed by Shatapushpadi Ghanavati, Ayurveda management of infertility associated with Poly Cystic Ovarian Syndrome: A case report, Clinical efficacy of Ayurveda treatment regimen on Sub fertility with Poly Cystic Ovarian Syndrome (PCOS), Evaluation of the Effects of Caesalpinia crista on Letrozole-Induced Models of Polycystic Ovarian Syndrome, Effect of Aloe barbadensis Mill. Formulations on Letrozole induced polycystic ovarian syndrome rat model etc. were observed.

Discussion:-

The change in the number of academic papers is an important research indicator reflecting the development trend in this field. As shown in, 16590 papers were searched for PCOS from 2004 to 2023. The analysis of published countries in Chart**1.2**shows that China accounts for the 3470 of the total number of publications and is the country with the largest number of publications. This indicates that China is an international scientific center for research in PCOS.Age wise distribution indicates that polycystic ovary syndrome (PCOS) is one of the multifaceted diseases with a broad spectrum of manifestations affecting not only women of reproductive age but also the adolescents and the postmenopausal women. Although the first clinical manifestations of PCOS are present in adolescent females, there is clear evidence that the disease has its origin in the intrauterine environment, indicating the genetic involvement.[9]Although majority of studies on PCOS have examined only the reproductive and metabolic disturbances of women of reproductive age, as we know, PCOS is a chronic condition which must be managed throughout a woman's life. Nonetheless, few longitudinal studies have been conducted with postmenopausal women who were initially studied 20–30 years ago to examine changes in PCOS presentation associated with age. Till date, various studies have attempted to answer questions about PCOS and menopause such as, what happens in menopausal transition in PCOS, what is the age of menopause in women with PCOS, whether the syndrome gets worse or improves after menopause, or whether it can be cured or it simply disappears. Fortunately, these studies have successfully answered many such questions. There is little number of clinical studies on Ayurveda interventions for PCOS with a promising role in managing symptoms of PCOS have been observed on Pub med database. However, a few research gaps were identified as Ayurveda can contributes inAyurvedic diet and lifestyle modification in cases of PCOS, a greater range of outcome measures such as obesity, type 2 diabetes, depression, and quality of life needs to be further explored in women with PCOS and there is a great scope to prevent or manage long term complications like cardio vascular diseases, diabetes etc.

List of Charts:

Chart 1.1: Global annual publication number during 2004-2023.

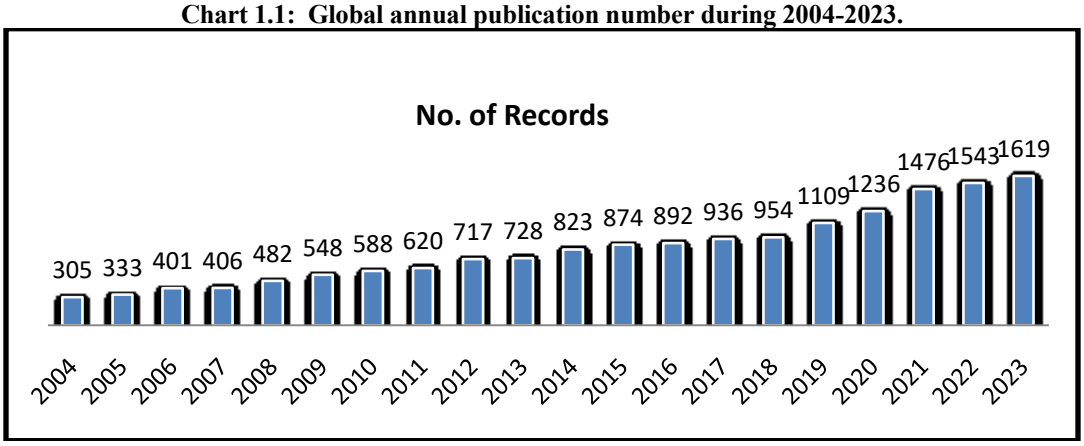


Chart 1.2: Countries with highest number of PCOS -related published articles

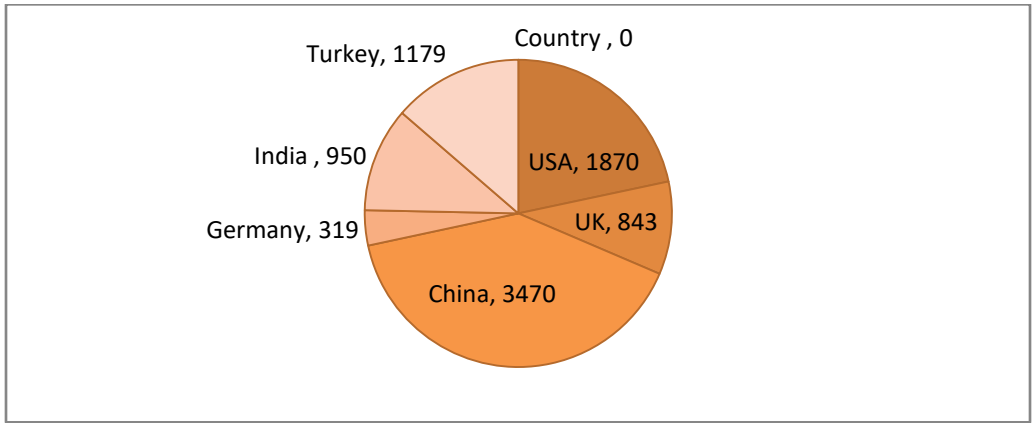
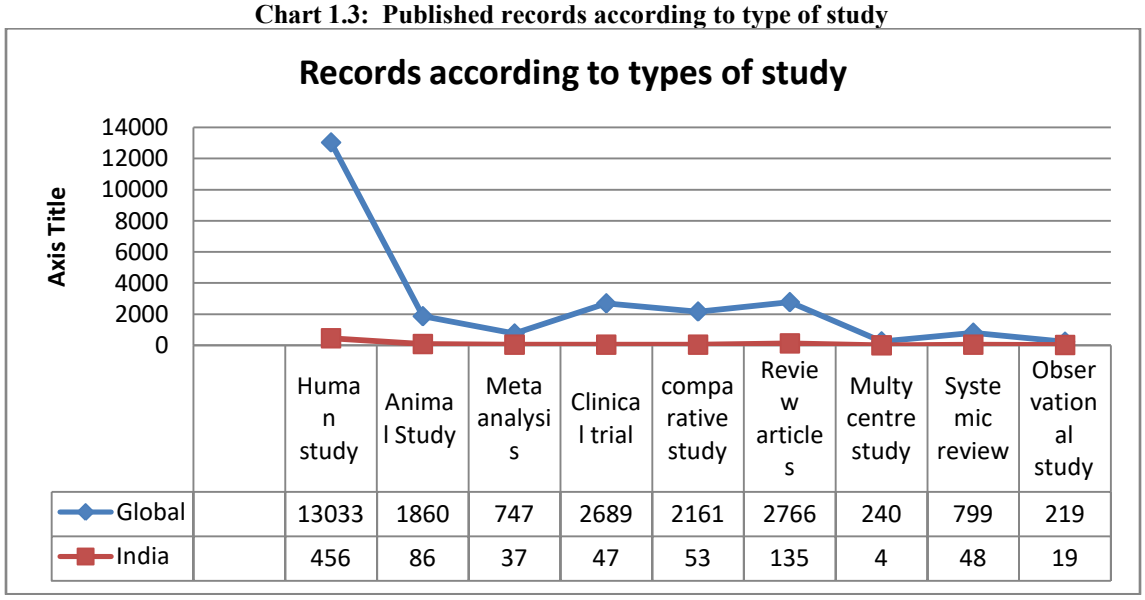
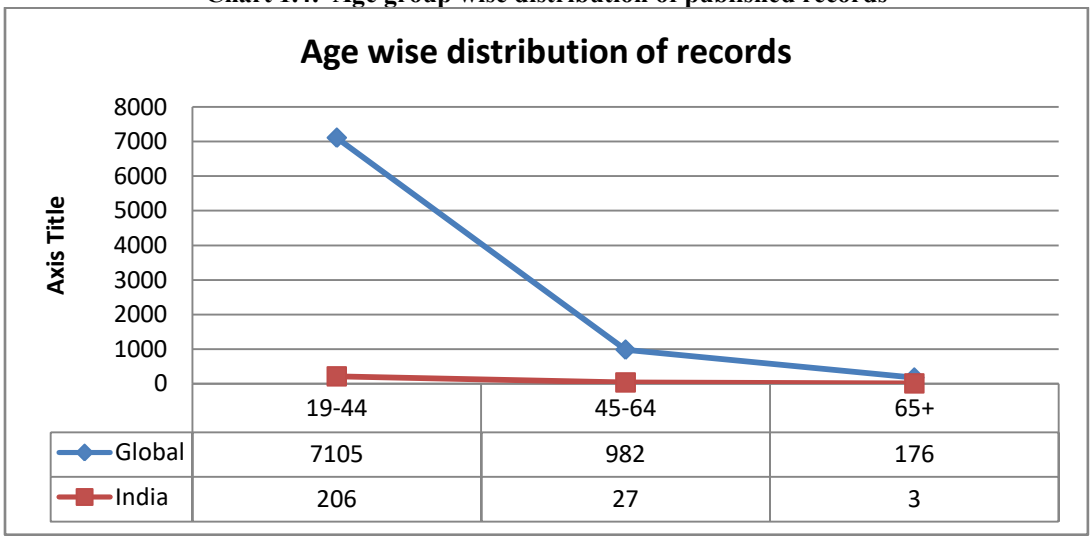


Chart 1.3: Published records according to type of study



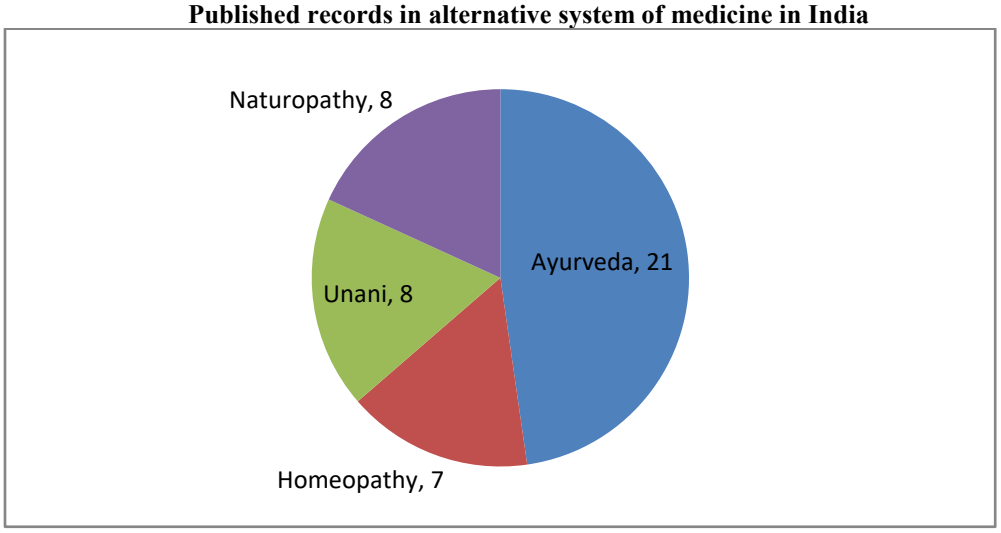
	Human study	Animal Study	Meta analysis	Clinical trial	comparative study	Review articles	Multy centre study	Systemic review	Observational study
Global	13033	1860	747	2689	2161	2766	240	799	219
India	456	86	37	47	53	135	4	48	19

Chart 1.4: Age group wise distribution of published records

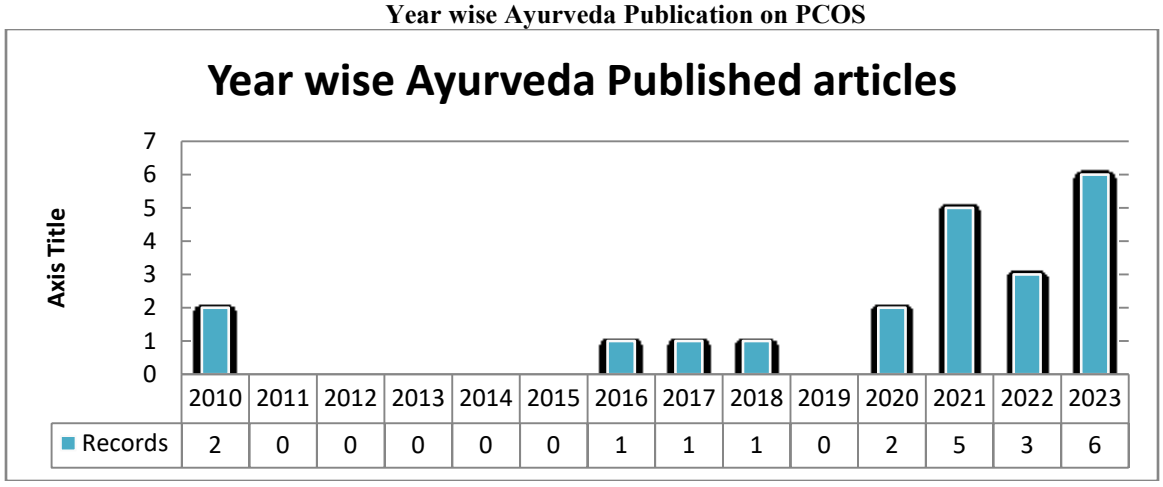


	19-44	45-64	65+
Global	7105	982	176
India	206	27	3

Published records in alternative system of medicine in India



Year wise Ayurveda Publication on PCOS



Conclusion:-

This Mapping of scientific research articles on PCOS from the Pub med database 2004 to 2023 illustrates the global and Ayurveda research status and trends of PCOS. This contributes to help medical personnel clarify the long research history of PCOS and find new research hotspots as well.Research on PCOS is not limited to the treatment of infertility and menstrual irregularities in obstetrics and gynecology, while more is to endocrine metabolic monitoring and treatment, lifestyle change and psychological intervention. More attention has been paid to the improvement of patients' quality of life. Though this paper provides a review of the publications on PCOS from 2004 to 2023, it has some limitations too. As in this research paper, we had collected relevant articles only from the Pub med database, there may still be some publications have not been included.

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